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THE OLDEST SIPHONOTRETA.

By G. F. MATTHEW, D.Sc., F.R.S.C.

(Read before the Natural History Society of New Brunswick, January 5, 1897.)

THE ancient Brachiopodous genus *Siphonotreta* is well known by its species occurring in the Ordovician and Silurian strata of Russia and Great Britain, and its peculiar pedicle opening has been the subject of remark. The author is not aware that this genus has hitherto been reported from any Cambrian terrain, and, therefore, the greatest interest will attach to a form recently found in the lower beds of the St. John Group, which is nearer to *Siphonotreta* than to any other known genus.

The new form is remarkable, so far as its pedicle passage is concerned, in combining the two genera *Siphonotreta* and *Schizambon*; for in its early stages it had the dorsal furrow of the latter genus, but afterwards it developed the tubular passage seen in the former.

This shell is older than any *Paradoxides*, being of the *Protolenus* Fauna,¹ and is found in strata that nearly correspond in age to the beds which at another locality carry the related genus *Trematobolus*. But while the new form abandoned the Schizambonal opening for its pedicle, and adopted a contracted canal for the passage of this organ similar to that of *Siphonotreta*, *Trematobolus* maintained the open fissure (or hole) through life.

Young individuals of the new form of the size of *Schizambon typicalis*, Walcott, are actual examples of the genus *Schizambon*. The history of the growth of the species from the larval forms to maturity is shown by exfoliated shells, in which the siphon stands

¹ Trans. New York Acad. Sci., vol. xiv, pp. 101-153.

out, while the adjoining shell-layers are weathered away. The shell of this species was thin during the Schizambonal stage, but thickened rapidly by the accretion of layers within the shell during the *Siphonotretal* stage. As, however, the parts of these layers around the tube were not perfectly calcified, that organ in exfoliated shells stands out and remains as a projecting tube, after the layers of shell, as above remarked, are weathered away.

In an exfoliated shell, therefore, we have a siphon projecting from what seems to be the inner side of the shell, and simulating the figures given of the interior of the ventral valve of *Siphonotreta unguiculata*, Eichwald.¹ And the resemblance to that species in other respects is significant, for, in the first place, the passage for the pedicle in the new form diminishes in size from that which it had at the close of the Schizambonal stage, until maturity; and it will be noted that in the species of *Siphonotreta* named above, it is said that the internal tube diminishes in size as it passes inward.²

It is also stated that in *Siphonotreta unguiculata* the muscle-marks are very near the internal opening of the tube. This is not noticeably the case with the new form when the interior of the shell is completely preserved; but in exfoliated examples where the siphonal tube is exposed, the muscle-markings on the shell-layers remaining, being those of the early *Siphonotretal* condition, are much nearer the siphon, and so are like those accredited to the species above named.

The new form has no exserted siphon showing on the inner surface of the shell, and it will easily be seen that such a projecting tube would involve anatomical conditions different from those of most of the early Neotrematous Brachiopoda. It would appear that a siphon projecting inside the shell is not an invariable characteristic of *Siphonotreta*, for Davidson figures *S. unguiculata* with a scarcely projecting siphon,³ and De Verneuil shows the inside of an umbo of *S. verrucosa*, De V., in which the opening for the pedicle lies in a little saucer-shaped hollow, as in our species.⁴

In some species referred to *Siphonotreta*, the pedicle passage opens outward just behind the beak; in others a channel extends along the back of the shell for some distance, and then a hole gives passage to the interior of the shell, there being no siphon or tube. These latter have been divided off by Walcott as the genus *Schizambona*. Since, however, the St. John species agrees exactly neither with this section nor the other, but in its pedicle passage combines the characters of both, it is necessary to establish for it a separate place. Linking together as it does the genera of De Verneuil and Walcott, it would seem proper to regard both *Schizambona* and the new form as subgenera of *Siphonotreta*, and with this view the author would propose for the new form the name *Protosiphon*, for which the above remarks will give the essential characters.

¹ See "Manual of the Mollusca," S. P. Woodward, London, 1875, p. 390, fig. 201.

² Hall and Clarke, "Genera of Palaeozoic Brachiopoda," Albany, 1892, p. 110.

³ Geol. Mag., London, 1877, Pl. II, Figs. 9, 11. See also Hall and Clarke, "Genera of Palaeozoic Brachiopoda," pl. iv, fig. 25.

⁴ "Russia and the Ural Mountains," Paris, 1845, vol. ii, pl. i, fig. 142.

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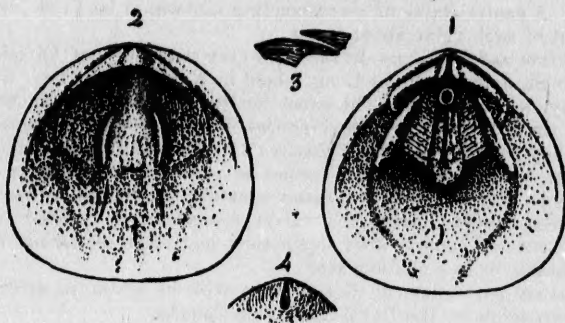
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PROTOSIPHON, n. subgen.

PROTOSIPHON KEMPANUM, n.sp.¹

Protosiphon Kempanum.—1. Interior of the ventral valve, showing scars of central and lateral muscles, opening of the siphon, vascular trunks, etc. 2. Interior of the dorsal valve, showing position of the central and lateral muscles, median ridge, vascular trunks, etc. 3. Section of the beak of the ventral valve, showing the passage for the pedicle. 4. Umbo of the ventral valve viewed from above, showing the Schizambonal furrow.—All the figures are magnified $\frac{1}{2}$, except No. 3, which is enlarged $\frac{1}{4}$.—N.B. The large figures are somewhat idealized, as some features (e.g. the vascular trunks) are supplied from examples other than the two which formed the basis of these drawings.

Shell substance calcareo-corneous. Outline of the dorsal valve somewhat oblately orbicular; outline of the ventral valve similar, but with an obtusely pointed beak. Both valves moderately convex, and marked at the hinge area by transverse ridges of growth. The ventral valve has a depressed channel on the back, beginning at the beak and ending forward in a tube buried in the substance of the shell, and terminating inwardly in the visceral cavity by a minute opening.

The dorsal valve does not differ much from the ventral, except in the absence of a projecting beak, and in being more tumid in the posterior half. Both valves have a broad, shallow sinus towards the front, and so are there straighter than in other parts of their circumference.

The edges of both valves are flattened on the underside, and thickened at the cardinal line, where they are traversed by arched ridges and furrows, which may serve the purpose of articulation. A depression similar to a pedicle groove traverses the cardinal area of the ventral valve on the axial line; and a low tubercle holds a similar position on the dorsal valve.

Sculpture.—The surface of the shell is marked by fine lines, concentric to the umbo, and at intervals by stronger growth-lines.

¹ Dedicated to Dr. J. F. Kemp, Professor of Geology at Columbia College University, New York, well known for his work on the Archaean and Cambrian Geology of the State of New York.

Interrupted rows of tuberoles appear in certain places along these lines of growth.

Size.—The largest dorsal observed was 19 mm. long and 20 mm. wide. A ventral valve of corresponding size would be 1 mm. longer. Height of each valve about 5 mm.

Horison and Locality.—In the olive-grey sandstones of Division 1b of the St. John Group at Long Island in Kennebecasis Bay, King's County, N. B. Canada. The exact horison in Band b is uncertain: there are about fifty feet in thickness of these sandstones exposed, and they have the aspect of Assises 2 to 4; being from the upper part of the sandstones the species is probably from Assise 3 or Assise 4. These shells are found sparsely distributed in sporadic, lenticular layers, having the valves promiscuously packed within each other, as though after death they had been somewhat rolled on a beach, or in a shallow sea.

Further particulars of this species will be given in an article in preparation for the Royal Society of Canada.

ST. JOHN, N. B. CANADA.

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